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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 62760B	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US 03/29620	International filing date (day/month/year) 22.09.2003	Priority date (day/month/year) 23.09.2002
International Patent Classification (IPC) or both national classification and IPC C08L23/08		
Applicant DOW GLOBAL TECHNOLOGIES INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:
 - I ☒ Basis of the opinion
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 08.04.2004	Date of completion of this report 30.12.2004
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Bergmans, K Telephone No. +31 70 340-4189 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/US 03/29620**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-7 as originally filed

Claims, Numbers

1-25 received on 13.12.2004 with letter of 09.12.2004

Drawings, Sheets

1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-25
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-25
Industrial applicability (IA)	Yes: Claims	1-25
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Novelty (Art. 33 (2) PCT)

1. The document D1 (WO0110643) discloses a film (e.g. monolayer or multi-layer film) comprising a composition made of a mixture in an amount of 50-100 % of a homogeneous ethylene alpha olefin copolymer and a heterogeneous ethylene alpha olefin copolymer, and a polymeric resin in an amount of 0-50 % (claim 16). The polymeric resin can be e.g. ionomer or ethylene acetate or acrylate copolymer (claim 22). The difference with the present application is the melt strength of the polymeric resin.

2. The document D2 (EP0656393) discloses a resin composition comprising A) an ethylenic polymer having several endothermic peak, a melt flow between 0.5-50 g/10 min., and a density of 0.91-0.94 g/cm³ (page 3), B) an ethylenic copolymer having at least one endothermic peak, a melt flow between 0.5-30 g/10 min., and a density of 0.90-0.935 g/cm³ (page 4), C) an ethylenic copolymer having a melt flow between 0.5-30 g/10 min., and a density of 0.87-0.92 g/cm³ (page 4). The composition has more than three endothermic peaks (compound A). The composition is used in film and laminate applications (page 7 line 9-15). The difference with the present application is the melt strength of the ethylenic copolymer.

The document D3 (US6306969) discloses a composition comprising an ethylene polymer (20-80 wt%) selected from a homogeneous ethylene copolymer and a heterogeneous ethylene copolymer, characterised by more than one melting peak, and a high pressure free radical initiated ethylene polymer (80-20 wt%) e.g. low density polyethylene or ionomer (claims 1 and 14). The difference with the present application is the melt strength of the high pressure free radical initiated ethylene polymer.

The document D4 (US5863665) discloses an ethylene polymer extrusion composition comprising from about 75 to 95 percent, by weight of the total composition, of at least one homogeneously branched linear ethylene alpha-olefin interpolymers composition, and from about 5 to 25 percent, by weight of the total composition, of at least one high pressure ethylene polymer characterized as having a melt strength of at least 9 cN. The composition further comprises a heterogeneously branched linear ethylene polymer (claim 15).

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The composition is used in film and laminate applications. The difference with the present application is the amount of homogeneously branched polyethylene.

In view of the prior art cited, claims 1-25 appear to be novel and meet therefore the requirements of Art. 33(2) PCT.

Inventive step (Art. 33(3) PCT)

The document D4 (US5863665) discloses an ethylene polymer extrusion composition comprising from about 75 to 95 percent, by weight of the total composition, of at least one homogeneously branched linear ethylene alpha-olefin interpolymers composition, and from about 5 to 25 percent, by weight of the total composition, of at least one high pressure ethylene polymer characterized as having a melt strength of at least 9 cN. The composition further comprises a heterogeneously branched linear ethylene polymer (claim 15). The composition is used in film and laminate applications.

The subject-matter of claims 1-25 differs from this known D4 in

- A) the weight percentage of the homogeneously branched linear ethylene alpha-olefin interpolymers and heterogeneously branched linear ethylene interpolymers present in the mixture (not disclosed in the document D4)
- B) the multi-phase (multi-melting peaks) behaviour (not disclosed in the document D4)
- C) the characteristics of the homogeneously branched linear ethylene alpha-olefin interpolymers and heterogeneously branched linear ethylene interpolymers mixture

There is no evidence found in the present application showing that the distinguishable feature leads to an effect.

The problem to be solved by the present invention may therefore be regarded as a further composition.

The solution proposed in claims 1-25 of the present application is considered as not inventive (Art. 33(3) PCT).

The document D4 clearly shows the influence of the high melt strength high pressure ethylene polymer on the neck-in behaviour (Table 4 and column 60-65)

The document D2 indicates that the sealing characteristics are influenced by the different endothermic peaks (melting peak).

The document D1 discloses a composition and a monolayer or multi-layer film comprising the composition made of a mixture in an amount of 50-100 % of a homogeneous ethylene alpha olefin copolymer and a heterogeneous ethylene alpha olefin copolymer. The mixture satisfies the characteristics (density, Mw/Mn) disclosed in the present application.

Re Item VII

Certain defects in the international application

1. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in documents D1 and D3 is not mentioned in the description, nor are these documents identified therein.
2. The specification for an international application should be capable of being understood without reference to any other document (cf PCT Guidelines Ch. II 4.17). The expression "hereby incorporated by reference" found in the description are therefore not according to the PCT requirements. The specification for an international application should be capable of being understood without reference to any other document (cf PCT Guidelines Ch. II 4.17). The expression "hereby incorporated by reference" found in the description are therefore not according to the PCT requirements.

Re Item VIII

Certain observations on the international application

Clarity (Art. 6 PCT)

1. The attention to the applicant is drawn to the fact that if the application when amended contains an unnecessary plurality of independent claims, no further examination of any of the claims will be carried out.
2. Claims 5 and 15 are not supported by the description as required by Article 6 PCT. The claims indicate a melt index range from 10-30 grams/10min., while the description discloses a melt index from 6-20 grams/10 min. (page 4). This inconsistency between the claims and the description leads to doubt concerning the matter for which protection is sought, thereby rendering the claim unclear.

WHAT IS CLAIMED IS:

1. A polymer composition comprising
 - (A) from 60 to 80 weight percent of a mixture of at least one homogeneously branched polyethylene and at least one heterogeneously branched polyethylene and
 - 5 (B) from 20 to 40 weight percent of at least one polymer having a melt strength at least twice that of mixture (A).
2. The composition of Claim 1, wherein the mixture of (A) comprises from 40 to 75 weight percent of the homogeneously branched polyethylene and from 25 to 60 weight percent of the heterogeneously
10 branched polyethylene.
3. The composition of claim 1 wherein the homogeneously branched polyethylene is an interpolymers of ethylene and at least C3-C20 alpha-olefin.
4. The composition of claim 1 wherein the heterogeneously branched polyethylene has a molecular weight distribution, Mw/Mn, from 3 to 6.
- 15 5. The composition of claim 1 wherein the mixture of (A) has a melt index, I2, from 10 grams/10 minutes to 30 grams/10 minutes.
6. The composition of claim 1 wherein the mixture of (A) has a density of from 0.88 grams/cubic centimeter to 0.92 grams/cubic centimeter.
7. The composition of claim 1 wherein the mixture of (A) has at least
20 3 melting peaks on a differential scanning calorimetry curve.
8. The composition of claim 1 wherein the homogeneously branched polyethylene has a molecular weight distribution, Mw/Mn, from 1.5 to 3.
9. The composition of Claim 1, wherein the mixture of (A) comprises from 50 to 60 weight percent of the homogeneously branched polyethylene and from 40 to 50 weight percent of the heterogeneously
25 branched polyethylene.
10. The composition of claim 1 wherein (B) is selected from the group consisting of low density polyethylene, ethylene/carboxylic acid copolymers, ionomers of ethylene/carboxylic acid copolymers, ethylene vinyl acetate copolymers, high melt strength polypropylene homopolymer, and high melt
30 strength polypropylene copolymer.
11. A film layer made from a polymer composition, the composition comprising

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ART 34 AMDT

(C) from 60 to 80 weight percent of a mixture of at least one homogeneously branched polyethylene and at least one heterogeneously branched polyethylene and

5 (D) from 20 to 40 weight percent of at least one polymer having a melt strength at least twice that of mixture (A).

12. The film layer of claim 10, wherein the mixture of (A) comprises from 40 to 75 weight percent of the homogeneously branched polyethylene and from 25 to 60 weight percent of the heterogeneously branched polyethylene.

10 13. The film layer of claim 10, wherein the homogeneously branched polyethylene is an interpolymers of ethylene and at least C3-C20 alpha-olefin.

14. The film layer of claim 10, wherein the heterogeneously branched polyethylene has a molecular weight distribution, Mw/Mn, from 3 to 6.

15 15. The film layer of claim 10, wherein the mixture of (A) has a melt index, I2, from 10 grams/10 minutes to 30 grams/10 minutes.

16. The film layer of claim 10, wherein the mixture of (A) has a density of from 0.88 grams/cubic centimeter to 0.92 grams/cubic centimeter.

17. The film layer of claim 10, wherein the mixture of (A) has at least 3 melting peaks on a differential scanning calorimetry curve.

20 18. The film layer of claim 10, wherein the homogeneously branched polyethylene has a molecular weight distribution, Mw/Mn, from 1.5 to 3.

25 19. The film layer of claim 10, wherein the mixture of (A) comprises from 50 to 60 weight percent of the homogeneously branched polyethylene and from 40 to 50 weight percent of the heterogeneously branched polyethylene.

20. A fabricated article comprising the film layer of claim 10.

30 21. The composition of claim 1 further comprising at least one polymer selected from the group consisting of: low density polyethylene, linear low density polyethylene, high density polyethylene, blends thereof, polypropylene homopolymer, polypropylene random copolymer, styrene/butadiene copolymer, polystyrene, ethylene-vinyl acetate copolymer and cyclic-olefin copolymer.

22. The film layer of claim 10 further comprising at least one other layer.

35 23. The film layer of claim 10 wherein (B) is selected from the group consisting of low density polyethylene, ethylene/carboxylic acid copolymers, ionomers of ethylene/carboxylic acid copolymers, ethylene vinyl acetate

copolymers, high melt strength polypropylene homopolymer, and high melt strength polypropylene copolymer.

24. A film comprising at least two layers, one layer being made from a polymer composition, the composition comprising

5 (A) a mixture of at least one homogeneously branched polyethylene and at least one heterogeneously branched polyethylene and one other layer comprising

(B) at least one other polymer having a melt strength at least twice that of the mixture of (A).

10 25. A polymer composition comprising

(A) from 60 to 80 weight percent of an ethylenic polymer having at least three melting peaks and

(B) from 20 to 40 weight percent of at least one polymer having a melt strength at least twice that of (A).